

TABLE 2.—Free-air resultant winds (m. p. s.) during August, 1924

Altitude, m. s. l. (m.)	Broken Arrow, Okla. (233 meters)				Drexel, Nebr. (396 meters)				Due West, S. C. (217 meters)				Ellendale, N. Dak. (444 meters)				Groesbeck, Tex. (141 meters)				Royal Center, Ind. (225 meters)			
	Mean		7-year mean		Mean		9-year mean		Mean		4-year mean		Mean		7-year mean		Mean		6-year mean		Mean		7-year mean	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
Surface.....	S. 2° W.	4.2	S. 2° W.	3.5	S. 14° E.	2.1	S. 15° E.	1.7	N. 34° W.	0.6	S. 25° W.	0.1	S. 76° W.	1.4	S. 46° W.	0.8	S. 17° W.	3.2	S. 15° W.	3.1	S. 35° W.	1.6	S. 60° W.	1.5
250.....	S. 2° W.	4.3	S. 1° W.	3.6	S. 14° E.	2.1	S. 15° E.	1.7	N. 37° W.	1.0	S. 52° W.	0.2	S. 16° W.	4.0	S. 17° W.	4.1	S. 38° W.	1.8	S. 62° W.	1.7	S. 38° W.	1.8	S. 62° W.	1.7
500.....	S. 3° W.	6.4	S. 12° W.	5.2	S. 20° E.	2.9	S. 11° E.	2.2	N. 19° W.	1.5	N. 24° W.	0.8	S. 61° W.	2.1	S. 36° W.	1.2	S. 16° W.	5.8	S. 22° W.	5.9	S. 49° W.	3.2	S. 66° W.	3.6
750.....	S. 13° W.	7.4	S. 19° W.	5.8	S. 7° E.	4.3	S. 4° W.	3.2	N. 11° W.	1.7	N. 78° W.	0.8	S. 58° W.	3.3	S. 37° W.	2.1	S. 15° W.	6.7	S. 21° W.	6.0	S. 47° W.	5.3	S. 70° W.	4.5
1,000.....	S. 18° W.	7.9	S. 27° W.	6.2	S. 5° W.	4.5	S. 21° W.	3.3	N. 5° W.	1.7	N. 78° W.	0.7	S. 74° W.	3.3	S. 49° W.	2.4	S. 17° W.	6.6	S. 21° W.	5.9	S. 62° W.	6.2	S. 77° W.	5.6
1,250.....	S. 24° W.	7.3	S. 34° W.	5.9	S. 36° W.	5.2	S. 48° W.	3.1	N. 2° E.	2.0	N. 31° W.	1.0	S. 73° W.	3.7	S. 59° W.	2.8	S. 20° W.	5.7	S. 68° W.	5.7	S. 68° W.	7.2	S. 83° W.	6.4
1,500.....	S. 30° W.	7.9	S. 40° W.	5.7	S. 43° W.	5.4	S. 50° W.	3.9	N. 9° W.	2.3	N. 37° W.	1.9	S. 76° W.	4.6	S. 68° W.	3.4	S. 18° W.	6.1	S. 19° W.	5.0	S. 76° W.	7.8	S. 87° W.	7.2
2,000.....	S. 36° W.	6.9	S. 45° W.	5.1	S. 56° W.	6.2	S. 66° W.	5.2	N. 35° W.	3.1	N. 79° W.	2.7	S. 88° W.	5.1	S. 84° W.	4.6	S. 10° W.	5.5	S. 12° W.	4.2	S. 78° W.	8.9	S. 87° W.	8.1
2,500.....	S. 37° W.	6.0	S. 50° W.	5.1	S. 63° W.	9.2	S. 73° W.	6.7	N. 62° W.	4.5	N. 82° W.	4.0	S. 89° W.	7.3	N. 88° W.	8.9	S.	5.0	S. 14° W.	4.2	S. 81° W.	10.5	N. 85° W.	9.4
3,000.....	S. 36° W.	5.6	S. 50° W.	5.7	S. 68° W.	11.6	S. 81° W.	8.5	N. 65° W.	4.5	N. 87° W.	5.6	N. 88° W.	9.5	N. 81° W.	8.4	S. 11° W.	5.0	S. 20° W.	4.5	S. 75° W.	13.6	N. 86° W.	11.1
3,500.....	S. 35° W.	6.5	S. 46° W.	6.8	S. 71° W.	13.5	S. 82° W.	9.7	N. 80° W.	8.3	S. 88° W.	7.7	N. 88° W.	12.0	N. 79° W.	11.0	S. 6° W.	5.5	S. 12° W.	5.1	S. 76° W.	14.0	N. 89° W.	11.1
4,000.....	S. 35° W.	6.7	S. 55° W.	8.3	S. 84° W.	14.2	S. 88° W.	11.1	W.	8.8	N. 87° W.	8.9	N. 87° W.	13.1	N. 77° W.	11.5	S.	6.7	S. 11° E.	3.2	S. 82° W.	14.8	S. 87° W.	12.6
4,500.....	S. 49° W.	7.8	S. 62° W.	7.5	N. 81° W.	10.2	N. 71° W.	10.5	W.	8.2	N. 86° W.	11.2	N. 73° W.	15.4	N. 75° W.	11.9	S.	4.3	S. 34° E.	7.8				
5,000.....	S. 68° W.	16.0	S. 68° W.	16.0	N. 49° W.	11.8	N. 65° W.	12.8			S. 67° W.	18.4	N. 67° W.	14.4	N. 82° W.	12.8								

## THE WEATHER ELEMENTS

## TEMPERATURE

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## PRESSURE AND WINDS

The distribution of the atmospheric pressure during August, 1924, showed no important deviation from that usually prevailing during the summer months, save for the large number of slight cyclonic depressions that persisted over the lower Missouri and upper Mississippi Valleys, particularly during the first decade. These usually developed only slight pressure gradients, but were attended by frequent thunderstorms, locally heavy rain, and, as a rule, pursued short courses toward the upper Lakes, where they mainly disappeared. Slight barometric depressions were rather frequently observed over the southwestern districts, but these likewise usually developed little strength, pursued short courses, and brought but little precipitation to those districts.

The anticyclones of the month, as in the preceding July, were the dominant feature of the atmospheric circulation, and, though they developed little prominence, pursued rather definite courses across the country.

The average pressure for the month was slightly higher than normal over the Pacific Coast States, in portions of the lower Mississippi Valley, and along the west Gulf coast. Elsewhere, including Canada, the average pressure was mainly less than normal.

Compared with the preceding month the average pressure was less in practically all parts of the country, only a small area over the extreme Northeast, including the Canadian Maritime Provinces, having averages materially higher than those of July.

Due to the absence of important cyclones or anticyclones the wind circulation was mainly moderate, and such high winds as occurred were usually associated with thunderstorms, except along the immediate Atlantic coast where some high winds occurred on the 25th and 26th in connection with a tropical storm that moved northeastward near the coast during that period. This storm was particularly severe along portions of the coast from New Jersey to southern New England. At Block Island it was reported as the worst summer storm ever experienced at that place, and other points in the vicinity suffered severely from the wind and high waters.

The prevailing wind directions were mainly from southern points over the Great Plains and to the eastward, save over the more northern districts where they were from the west or northwest. Elsewhere they were variable, as is usual.

The important feature of the temperature distribution during the month was the continued cool weather over the north central districts, which had persisted with more or less constancy from early in May until about the end of the second decade of August.

The first few days of the month were distinctly cool from the upper Mississippi Valley eastward and likewise over the Plateau and Pacific Coast States, but it was mainly warm in the central valleys and Southern States, the period being particularly warm in the central and southern Great Plains.

The week ending August 12 was cool throughout over nearly all districts from the Great Lakes and middle Mississippi Valley westward to the Pacific, but the temperatures higher than normal continued in the South, and decidedly warmer weather overspread the more eastern districts, the maximum temperatures rising above 100°, the highest for the month, in portions of the Middle Atlantic States. The week ending August 19 continued cool over all northern and most central districts, the week being decidedly cool, 6° to 9° below normal, from the northern Plains eastward to the Great Lakes and Ohio Valley. Warm weather continued during most of this period in the South, particularly from Texas and Oklahoma westward to Colorado and eastern Arizona.

The cool weather that had persisted for so many weeks over much of the central and northern portions of the country from the Rocky Mountains eastward terminated near the end of the second decade of the month, and the average temperature for the week ending August 26 was above normal over practically all districts from the Rocky Mountains eastward, the period being unusually warm over the central and southern Rocky Mountains and thence eastward to the Ohio Valley and Middle Gulf States, where locally the highest temperatures of the summer were observed and in some cases the highest ever observed in August. From the 26th to the end of the month the temperature was mainly above normal throughout, save for the last day or two, when cool weather overspread the Northwest. Over portions of the Atlantic coast this period was locally the warmest of the summer, and likewise in the interior valleys of California, where some damage to drying fruit resulted, particularly raisins.

For the month as a whole the temperature averages were below or only slightly above normal from the Great Lakes westward to Washington and Oregon, and over central and southern California and apparently over all

of western Canada. The month was moderately warmer than normal over practically all central portions from the Rocky Mountains eastward, while in most southern districts it was much warmer than normal; in fact, over many parts of this area the daily means were above normal practically every day, the monthly means were the highest of record for August, and in some cases the highest for any month in many years.

Maximum temperatures of 100° or higher were reported from all the States, save in the upper Lake region and New England, the highest observed, 124°, occurring in the desert region of California.

Temperatures slightly below freezing were reported from practically all the northern border States, and they were materially below at exposed localities in all the western mountain States, the lowest observed, 12°, occurring in Idaho.

#### PRECIPITATION

The precipitation for the country as a whole was greatly deficient, although a few sections had amounts far in excess of the usual fall.

Precipitation was frequent and locally heavy in the lower Missouri and upper Mississippi Valleys and the adjacent areas of the upper Lake region during the first two decades, and in portions of this area rains continued at short intervals until near the middle of the last decade, and fell again at the end of the month. In nearly all other portions of the country precipitation was less than normal or only slightly in excess. In most of the Southern States precipitation was greatly deficient and the month as a whole was among the driest, and, in some cases, the driest of record for August.

In portions of the east Gulf States, notably in Georgia and near-by districts, the long periods without material precipitation with the intense heat produced drought conditions of unusual severity, and crops deteriorated rapidly toward the end of the month. Likewise in Louisiana and portions of adjacent States the month was among the driest of record, and drought conditions that began early in the summer were not relieved until after the end of the month.

In Colorado and thence westward over the Plateau region the month continued dry and over the greater part of this region the season so far has been the driest for many years.

Farther west, there were some good rains in parts of northern California on the 18th and 19th, but over the

greater part of the State severe drought continued at the close of the month. Water shortage increased, and the deepening of old wells and digging of new ones to relieve the situation continued. Steam-power plants continued in operation to increase the production of electric energy; water for irrigation was insufficient and crops in many localities steadily declined from lack of water and from high temperatures, particularly near the end of the month; pastures became short; and conditions were favorable for forest fires.

On the other hand, the month was unusually wet in the lower Missouri and upper Mississippi Valleys and portions of the upper Lake region. In some localities of these areas the daily falls were unusually heavy, notably in the vicinity of Milwaukee, Wis., where the total fall was the greatest of record for August, the fall for the period from the 3d to 6th aggregating in some cases nearly 10 inches, resulting in severe floods. Also northern Illinois and eastern Iowa had heavy to excessive precipitation, attended locally by high wind and hail, causing much damage by flood and otherwise.

#### SNOWFALL

The only snowfall observed, as far as reports indicate, occurred in the mountains of Wyoming, where one station reported a measurable amount and several others had traces.

#### RELATIVE HUMIDITY

The percentage of relative humidity was nearly everywhere less than normal; the only section reporting an appreciable excess embraced the Missouri and upper Mississippi Valleys, portions of the Great Lakes region, and the interior section of New York and New England. In the Southern States the values were in some cases as much as 20 per cent less than normal, and deficiencies nearly as great were reported from portions of the Plateau and Rocky Mountain sections.

#### SUNSHINE AND CLOUDS

Generally there was abundant sunshine except over the upper Mississippi Valley, the Great Lakes region, southern Florida, and the far Northwest. In the interior portion of California the sunshine was almost continuous and there was a high percentage over portions of the Southern Plains, the lower Mississippi Valley and elsewhere in the South.